

Aboveground Storage Tanks (AST)

Enhanced Vapor Recovery Regulation

December 13, 2006

Topics

- Background
- Scope
- Certification Procedure
- Test Procedures
- Cost Effectiveness
- Timeline

BACKGROUND

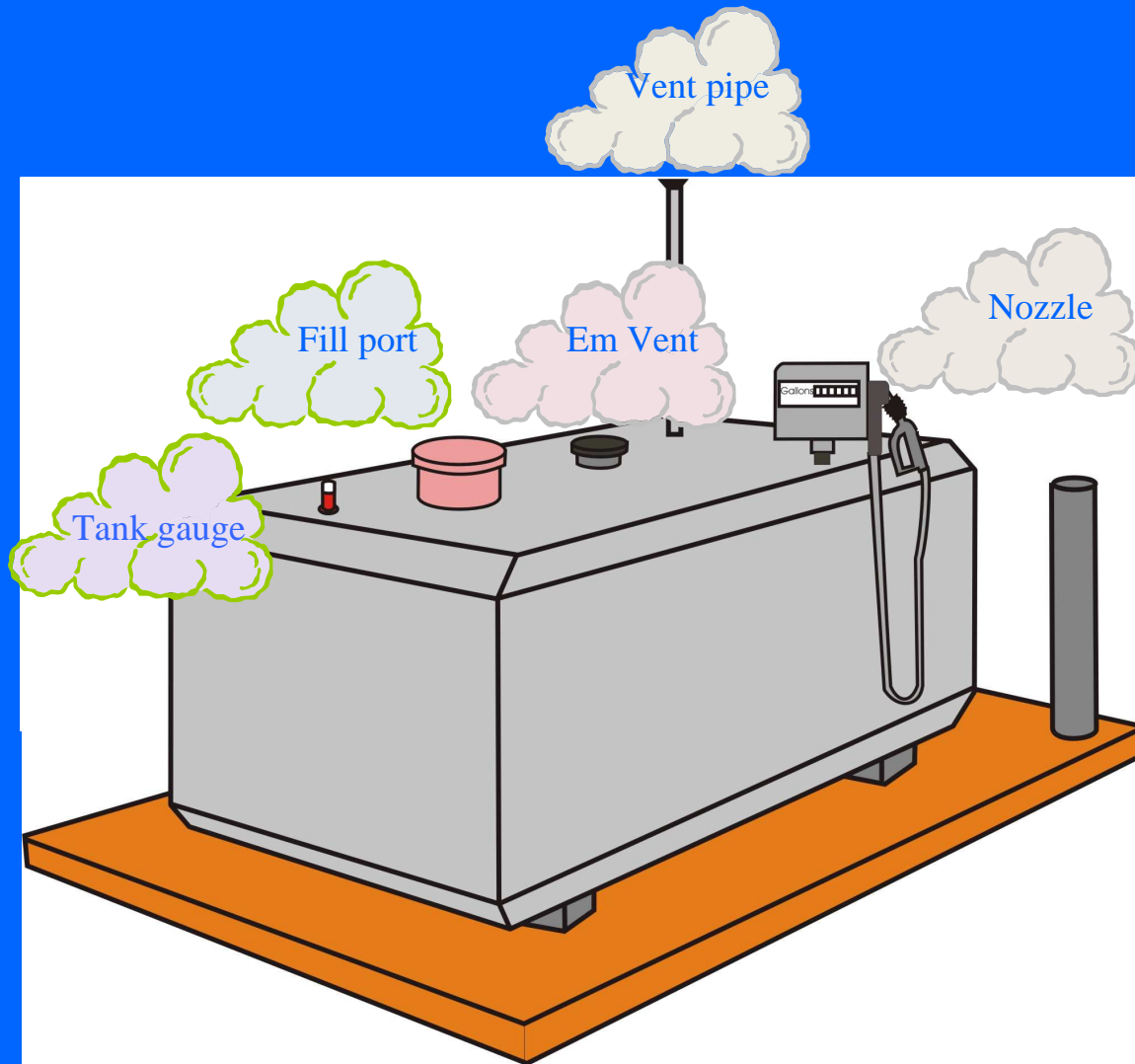
Background

Purpose of Regulation

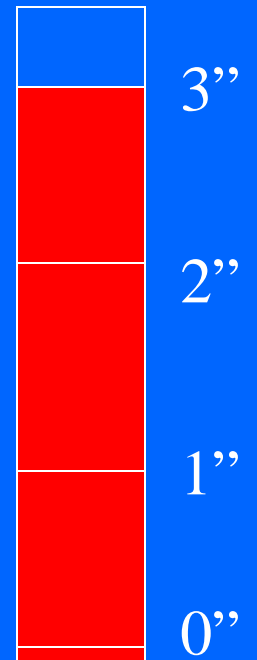
- Control Diurnal Vent Emissions
- Address Concerns with Executive Orders
- Make AST EVR similar to UST EVR
- Meet SIP Commitment for South Coast

Background

Emissions Sources

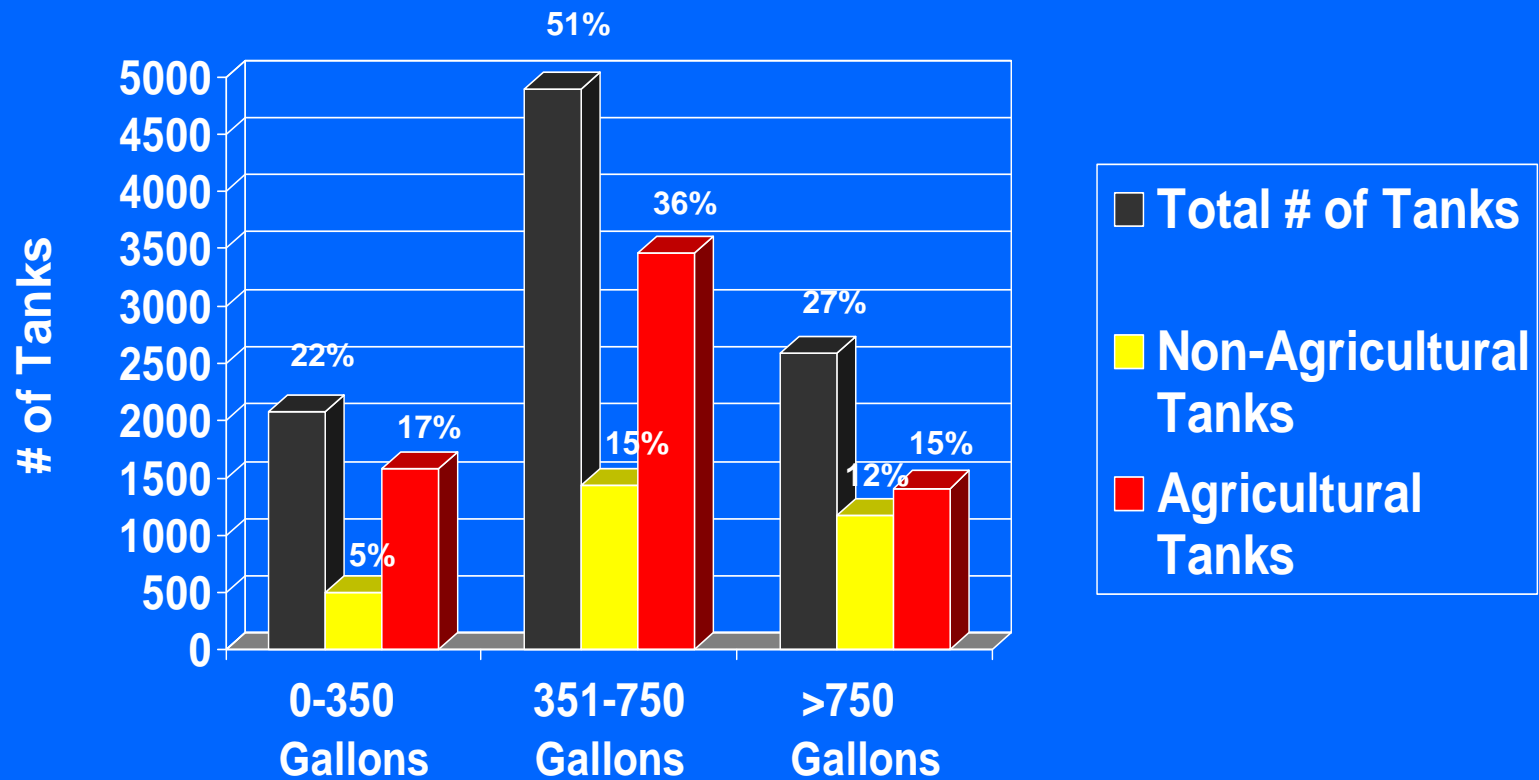


Pressure



Background

Population Survey Results



Note: Percentages are of total population.

Background

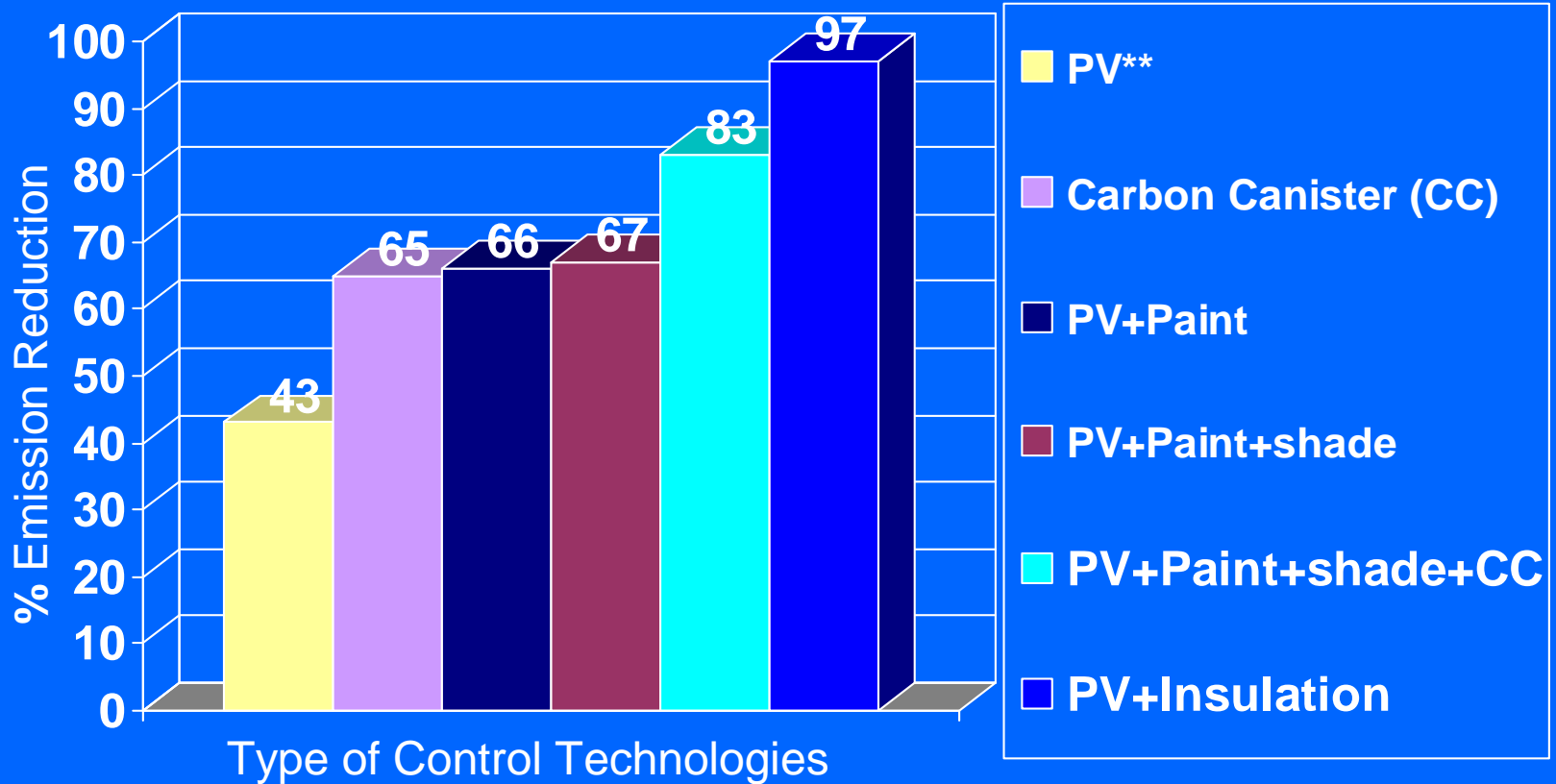
Field Study



12/13/2006

Background

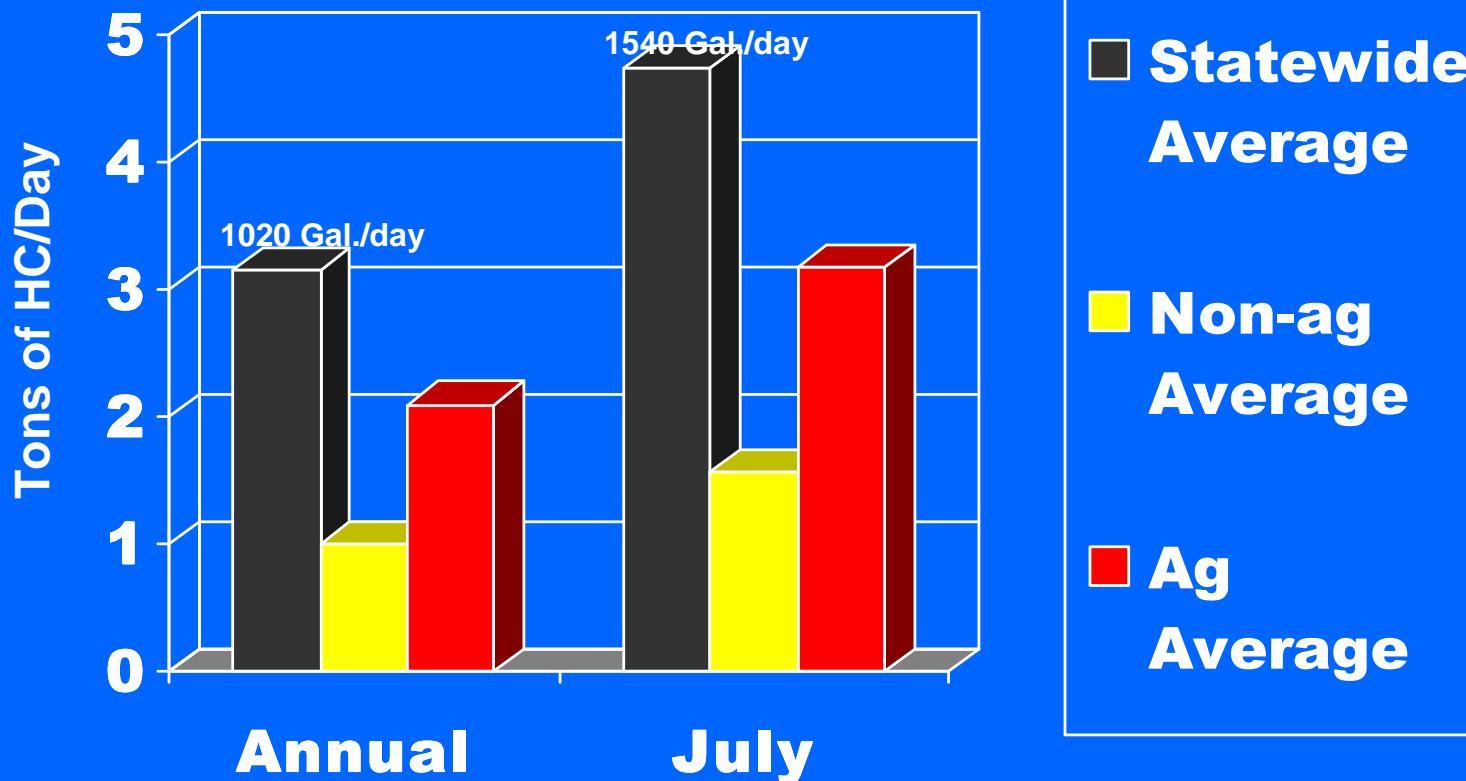
Field Study Results



**3"W.C. PV valve

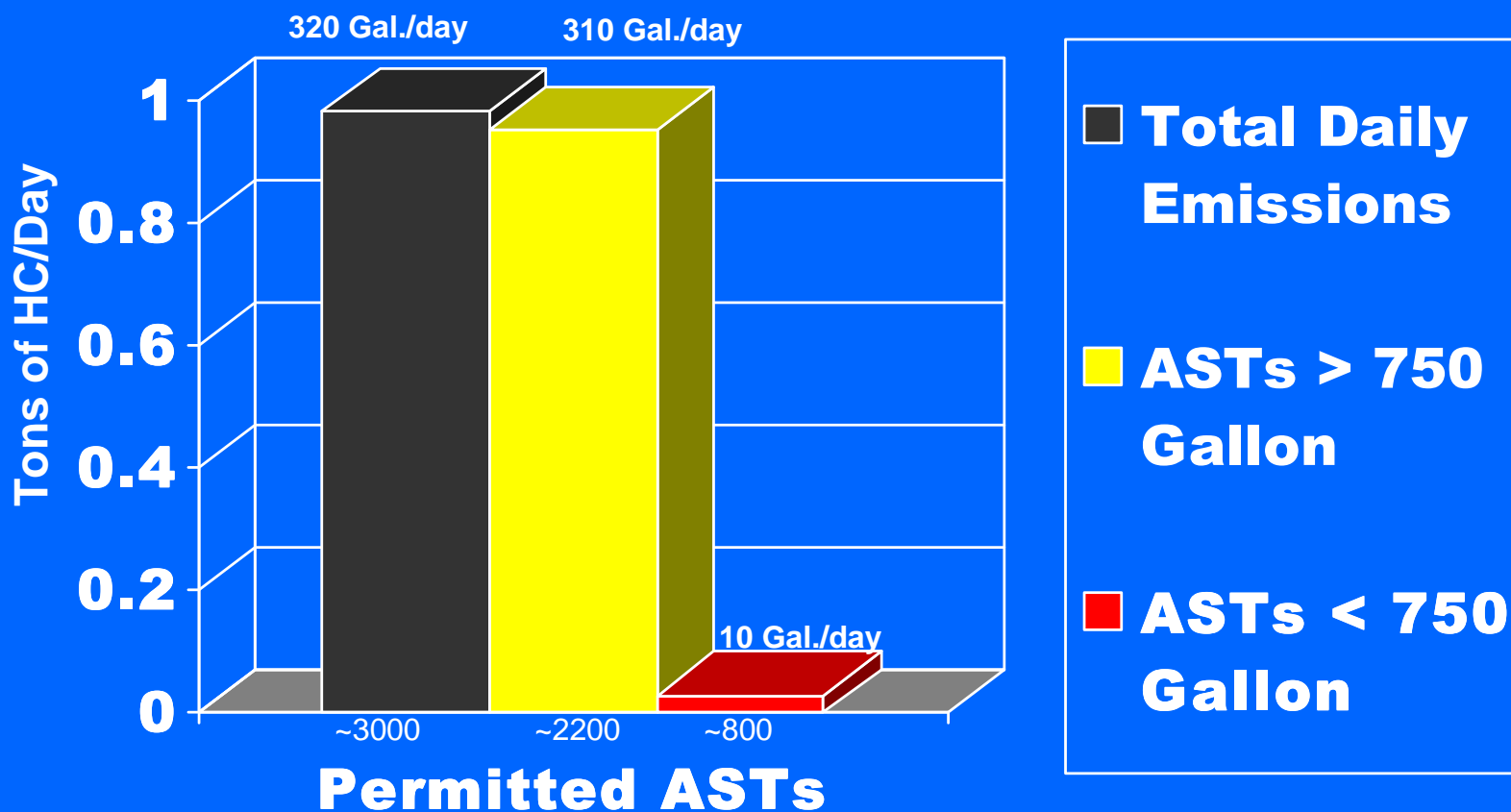
Background

Statewide Emission Inventory



Background

Statewide District Permitted Emission Inventory



Public Outreach

- Public Workshops
 - June 2005
 - September 2006
- Workgroup/Stakeholder Meetings and Presentations
 - CAPCOA, SWRCB, Fire Marshal
 - CIOMA, STI, Agricultural Community
 - Mead Westvaco, Equipment Manufacturers

SCOPE

Scope

- Aboveground Storage Tanks
 - Gasoline Dispensing Facilities
 - Fueling of Motor Vehicles (Vehicle Code)
 - District Rule Driven Applicability
- Not Included in Proposed Regulation
 - Bulk Plants
 - Aviation Gasoline

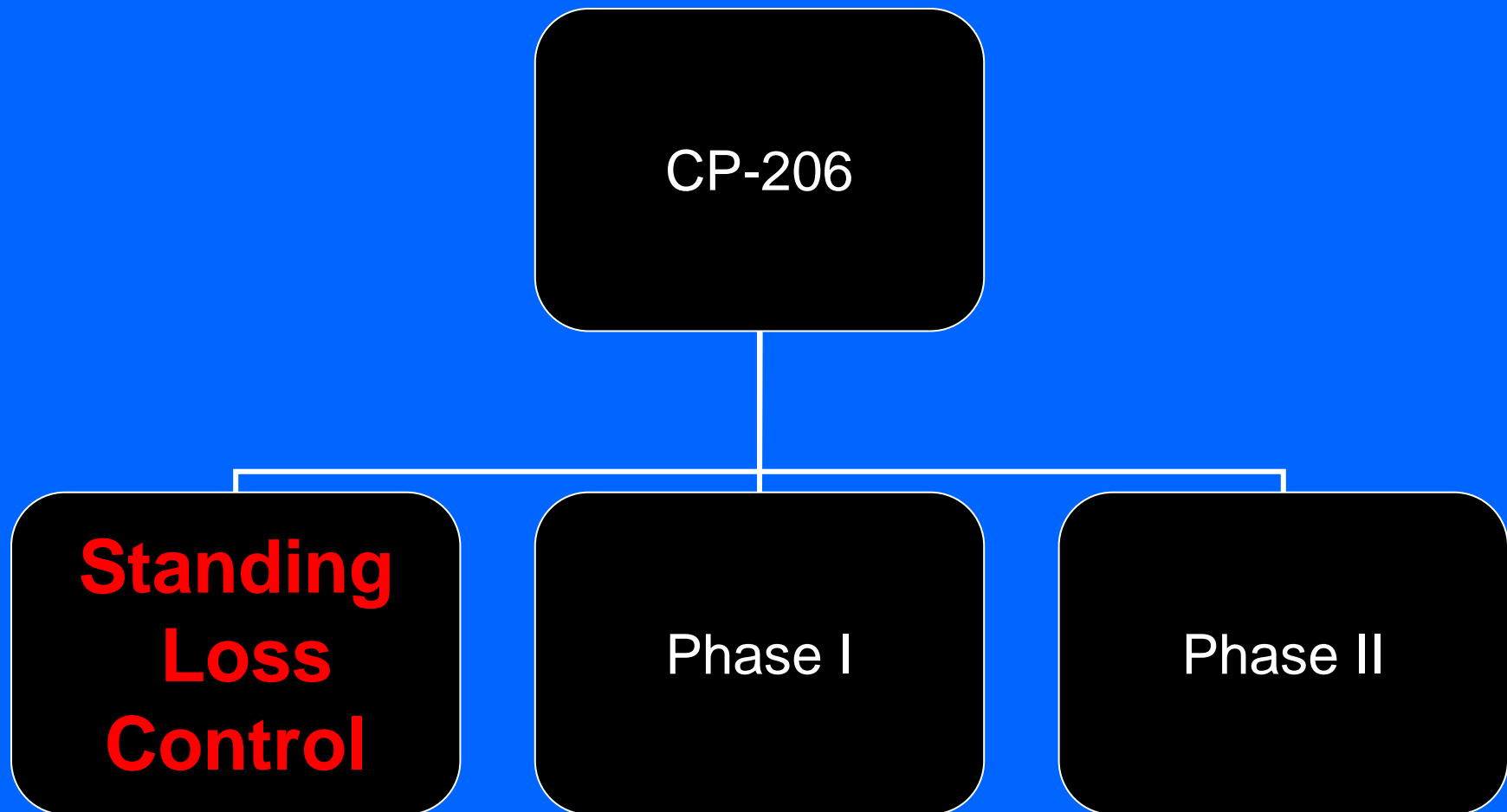
Scope

- Non-Vaulted Aboveground Storage Tanks
 - CP-206
- Vaulted Aboveground Storage Tanks
 - CP-201

CERTIFICATION AND TEST PROCEDURES

- Standing Loss Control
- Phase I
- Phase II

Certification and Test Procedures



CP-206

Standing Loss Control

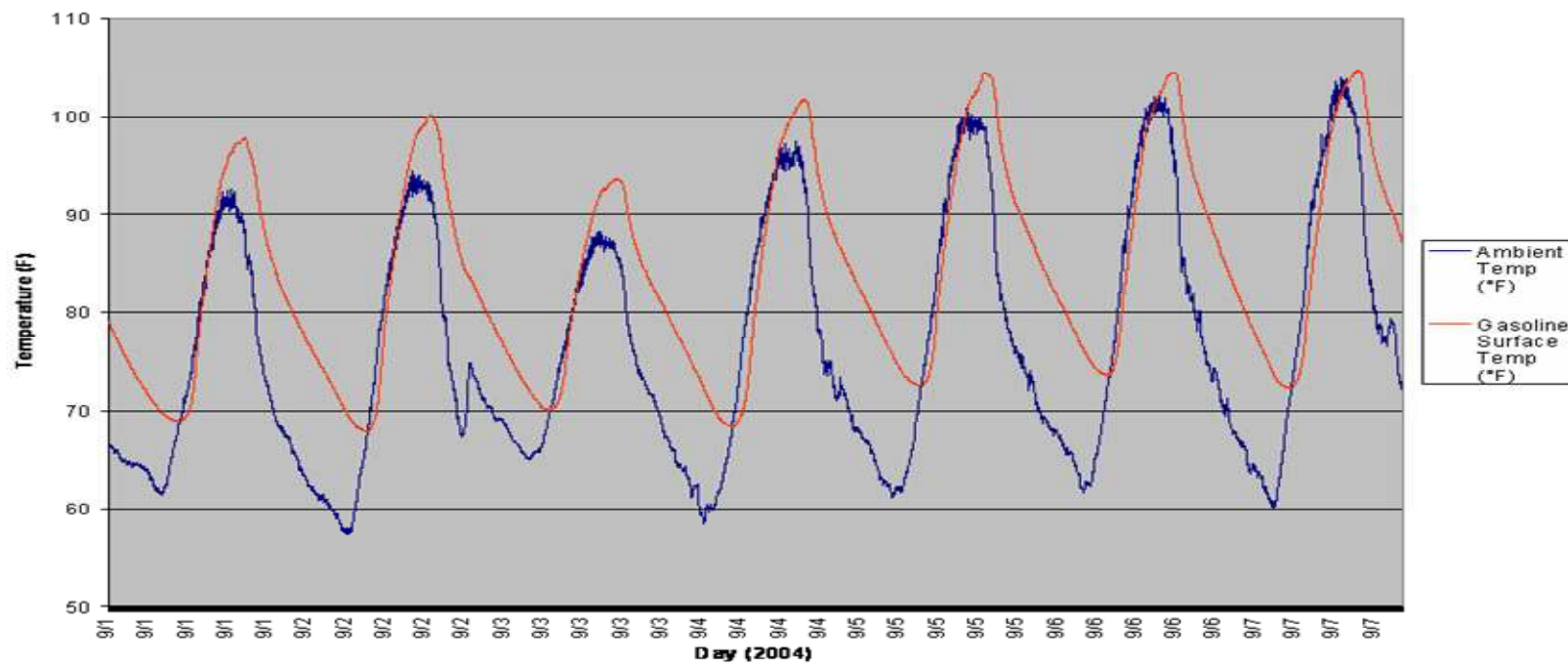
- Emission Factor Standard
 - New Installations
 - Existing Facilities (retrofit)
- Controls Emissions During Periods of No Work
 - TP-206.1: Temperature Attenuation (A_f)
 - TP-206.2: Processor [HC]
- Certification: Performance or Design Based
- Interchangeable with Phase I and Phase II Systems

Standing Loss Control

- Emission Factors (proposed)
 - New Installations: ≤ 0.57 lbs./1000 gal./day
 - Existing Facilities: ≤ 1.34 lbs./1000 gal./day
- Emission Factor (EF) = $EF_{Af} + EF_{[HC]}$

Standing Loss Control

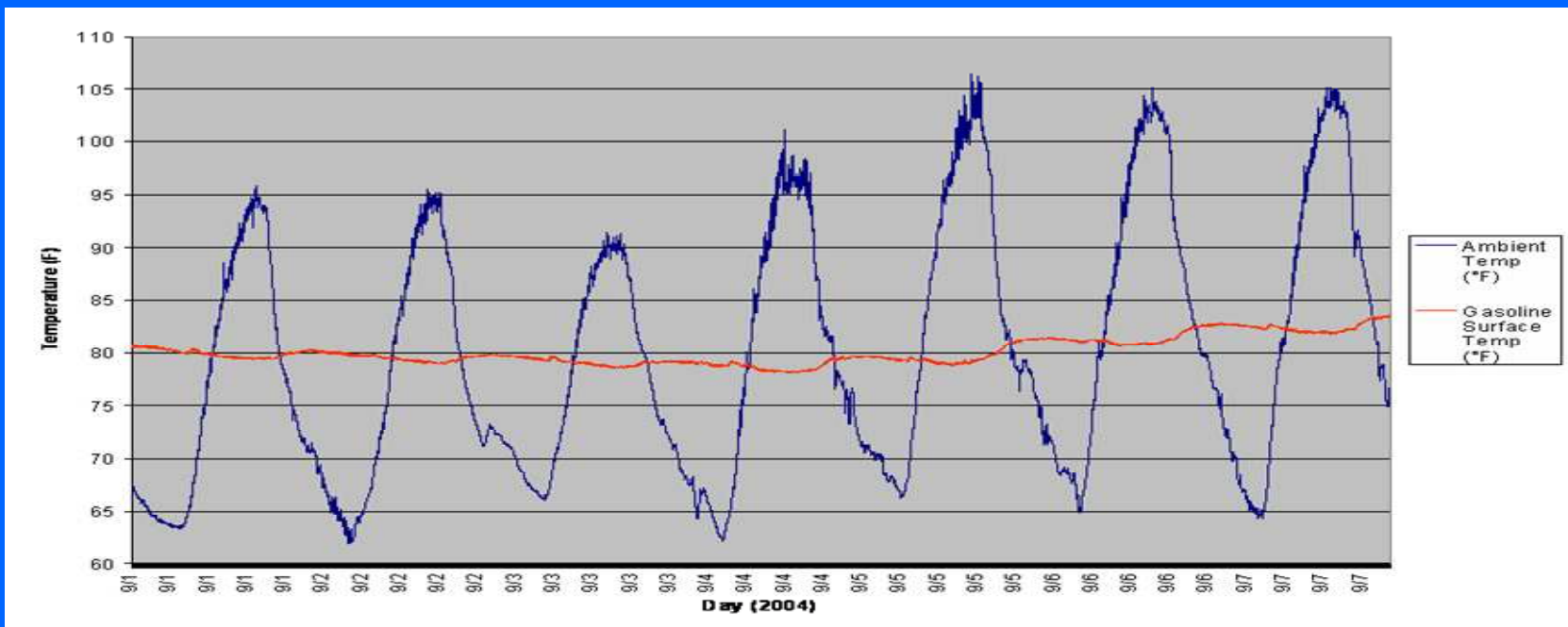
Temperature Attenuation



Single Wall Tank

Standing Loss Control

Temperature Attenuation



Insulated Tank

Standing Loss Control

Temperature Attenuation* (A_f)

$$A_f = \frac{(\sum_{1}^n T_f^{Range} / n)}{(\sum_{1}^n T_a^{Range} / n)}$$

Where:

$\sum_{1}^n T_f^{Range}$ = The sum of daily fuel surface temperature range

$\sum_{1}^n T_a^{Range}$ = The sum of daily ambient temperature range

n = number of data sets (days)

* Based on U.S. EPA Method AP-42 (Modified)

Standing Loss Control

Temperature Attenuation

- A_f Correlates to Emission Factor (EF)

$$EF_{A_f} = 3.41(A_f) - 0.28$$

When $A_f \leq 0.085$, $EF_{A_f} = 0$

- Minimum 30-day Test Duration
 - 7 days at temperatures between 90°F - 105°F
- Continuous Monitoring
- Static Pressure Performance Test
 - TP-206.3

Standing Loss Control

Hydrocarbon Processor



12/13/2006

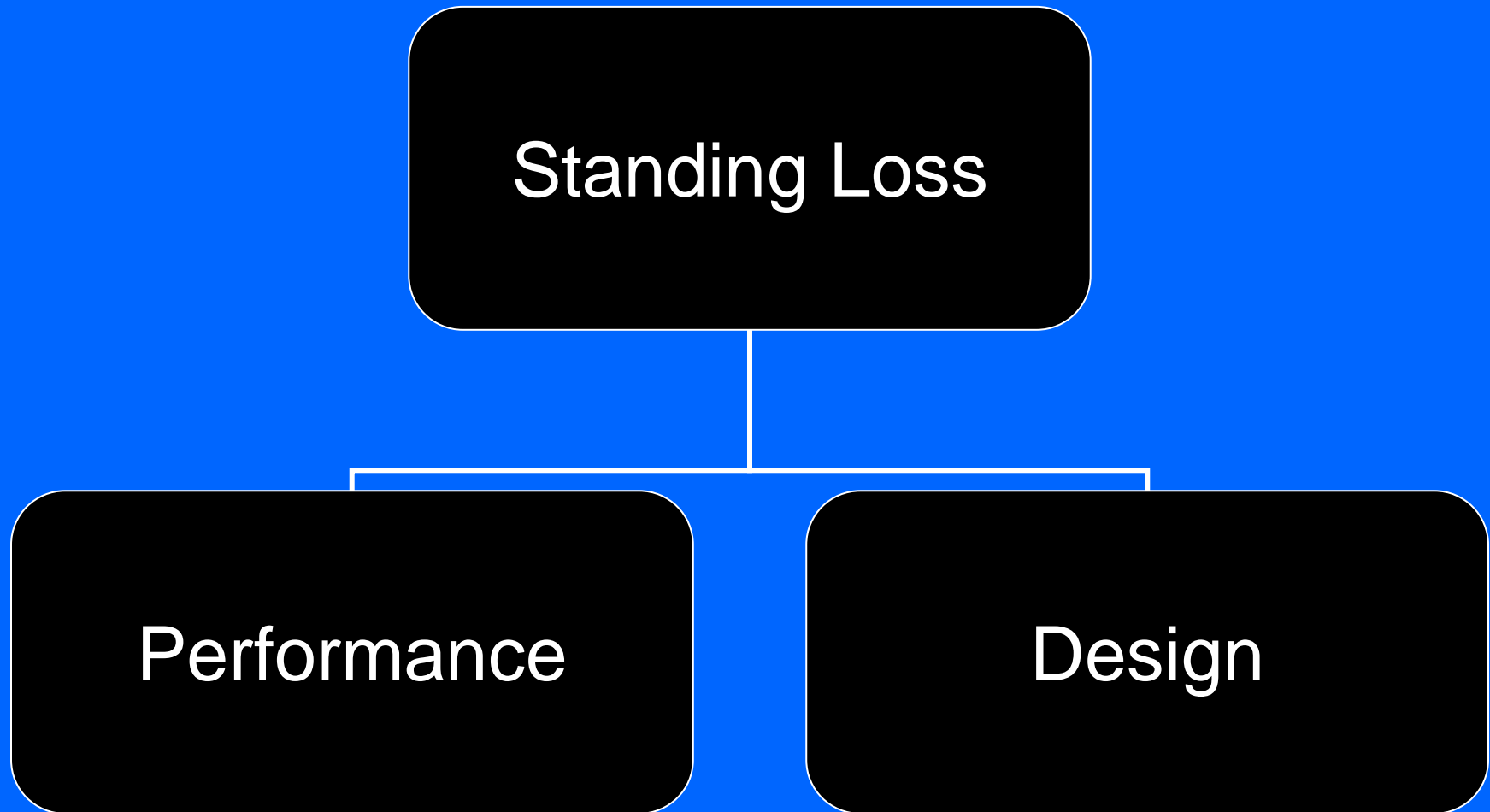
23

Standing Loss Control

Hydrocarbon Processor

- Hydrocarbon Emissions Measured:
 - TP-206.2
 - Directly using NDIR and FID HC detectors
 - Processor inlet and outlet
 - P/V valve
 - Leak tight system (TP206.3)
- Minimum 180-day Test Duration
- Non-Continuous Monitoring

Standing Loss Control



Standing Loss Control

Performance Approach

- Components Field Tested as System
- System Meets Emission Factor (New or Retrofit)
- System Issued Executive Order
- System Must Stay Together

Standing Loss Control

Design Approach

- Components Tested Independently
 - CP-206 Table 3-4 Specific Components
- Component Meets Emission Factor
- Certified Components Added to Executive Order
- Mix and Match Certified Components
 - CP-206 Table 3-3 defined configurations

Standing Loss Control

Design Approach

Table 3-4
Standing Loss Control Vapor Recovery System Design Based Components*
APPLICABLE TO TANKS THAT ARE NON - BELOW GRADE VAULTED AST

Emission Factor (lbs/1000 gal.)	Component(s)	Sec.	Std. Spec.	Test Procedure
0.57	Insulation	3.2	Spec.	TP-206.1
2.25	Shade or Paint	3.2	Spec.	TP-206.1
2.35	Processor	3.3	Std.	TP-206.2

*All components in Table 3.3 shall be certified with a Phase I P/V valve certified in accordance with Section 4.5 of this procedure.

Standing Loss Control

Design Approach

Table 3-3
Standing Loss Control Vapor Recovery System Design Configurations*
 APPLICABLE TO TANKS THAT ARE NON - BELOW GRADE VAULTED AST

Emission Factor	Component(s)			
(lbs/1000 gal.)	Insulation	Paint	Shade	Processor
0.57	X			
1.34		X		X
1.34			X	X

*All configurations in Table 3.4 shall include a Phase I P/V valve certified in accordance with Section 4.5 of this procedure.

Standing Loss Control

System Interchangeability

Vapor Recovery System Certification Matrix

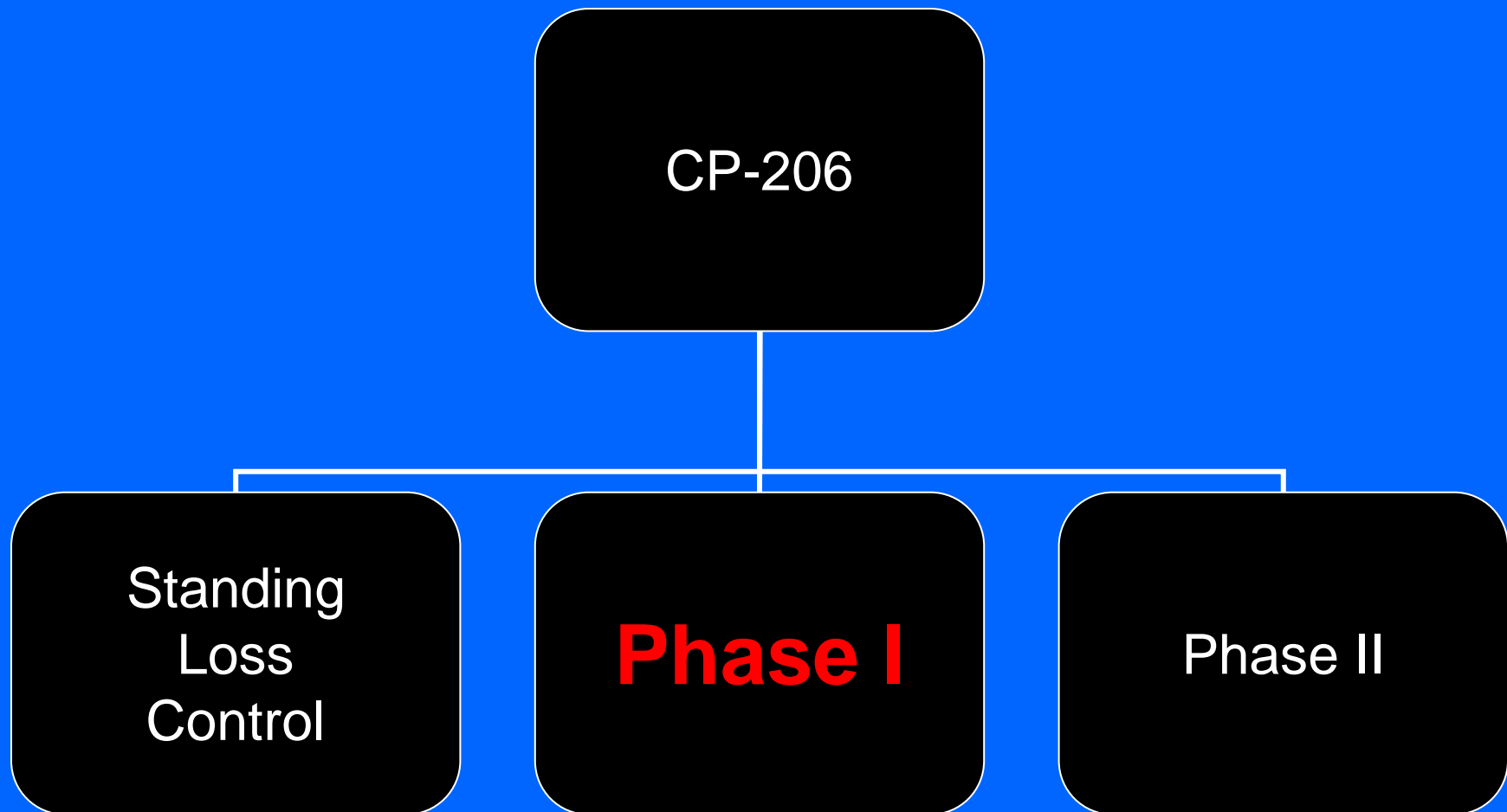
Vapor Recovery Systems			Compatibility
Standing Loss Control	Phase I	Phase II	Section(s)
X			n/a
X	X		4.10 & 12.3
X	X	X	4.10, 5.5, 5.6, & 12.3

Standing Loss Control

Summary

- Emission Factor
 - New Installations
 - Existing Facilities (retrofit)
- Emission Factor (EF) = $EF_{Af} + EF_{[HC]}$
- Certification Testing
 - Performance
 - Design

Certification and Test Procedures



CP-206

Phase I

- Currently 90% Efficiency
- Proposed 98% Efficiency
- Minimum 180 Day Test
- Cargo Tank to Aboveground Storage Tank
- New and Existing Facilities

Phase I

Performance Standards and Specifications

- Efficiency $\geq 98\%$
- Emission Factor ≤ 0.15 lbs/1000 gallons
- Static Pressure Performance
- Fixed Cam and Groove Adaptors w/ caps
- P/V Relief Valve
- Emergency Vent
- Gauging Port
- Drop Tube with Overfill Prevention
- Spill Container with Drain Valve

Phase I

Performance Standards and Specifications

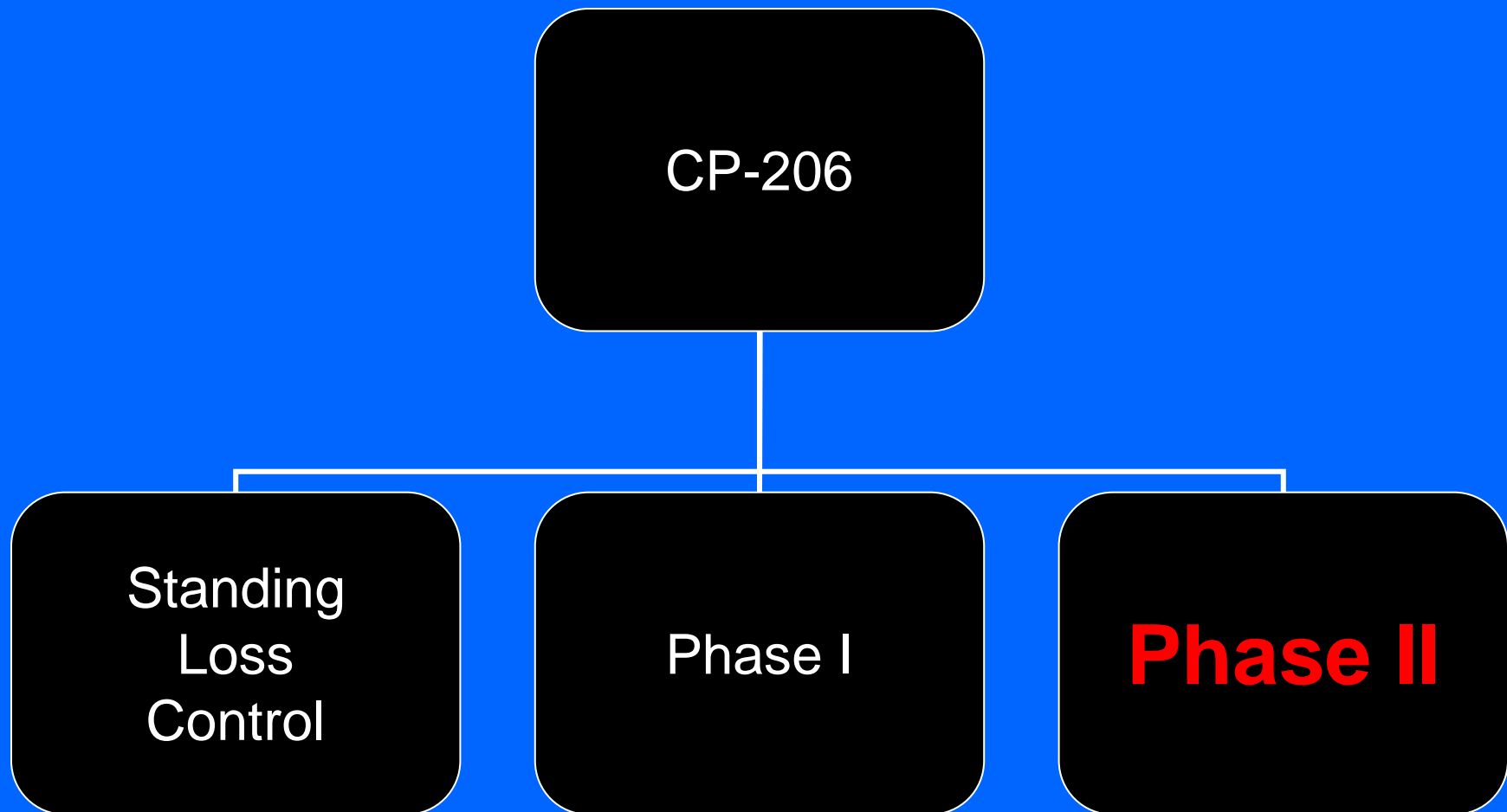
- No Indication of Vapor Leaks
 - Emergency Vent
 - Vapor Connectors and Fittings
 - Side or Bottom Fill Adaptors
 - Vapor Adaptors
 - Dedicated Gauging Ports with Drop Tube
- Leakrate Standards
 - P/V valve
 - Spill Container with Drain Valve
 - Drop Tube with Overfill Protection (Pressure)

Phase I

Compatibility

- Standing Loss Control Systems
- ARB Approved Fuel Blends

Certification and Test Procedures



CP-206

Phase II

- Currently 90% Efficiency
- Proposed 95% Efficiency
- Does not include:
 - Fugitives
 - Pressure Profile
- Certified with Phase I System
- Minimum 180 Day Test
- AST to Motor Vehicle
- New and Existing Facilities

Phase II

State Law

- California Health and Safety Code:
 - Liquid Retention (Dispensing Nozzle or Vapor Return Line)
 - No Excessive Liquid Spillage
 - ORVR Compatibility
 - Operating Hold Open Latch
 - ARB Required to Test for Certification

Phase II

Performance Standards and Specifications

- Efficiency (Summer Fuel)
 - $\geq 95\%$ and ≤ 0.38 pounds/1000 gallons
- Efficiency (Winter Fuel)
 - $\geq 95\%$ or ≤ 0.38 pounds/1000 gallons
- Static Pressure Performance
- Spillage
- Liquid Retention and Nozzle “Spitting”
- Liquid Removal System
- UST Nozzle Criteria

Phase II

Performance Standards and Specifications

- Hose Configurations
 - Unihose and coaxial
- Vapor Return Piping
- Vapor Riser
- Liquid Condensate Traps
- Connectors and Fittings
- Specific Balance and Assist requirements
- Processors
 - Destructive
 - Non-destructive

Phase II

Compatibility

- Compatibility with Standing Loss Control Systems
- ORVR Compatibility
- Compatibility with Phase I Systems
- Compatibility with Fuel Blends
- Nozzle – Dispenser Compatibility

Phase I and Phase II

Summary

- Increase System Efficiencies to EVR Standards
- Seek Emission Reductions
- AST and UST EVR Standards Consistent
- Ensure System Durability

COST ANALYSIS

Cost Effectiveness (CE)

Category	Avg. Cost (\$) per tank	Statewide Annual Cost (\$/yr)	Statewide Emission Reduction (lbs/yr)	CE (\$/lbs)
Pre-EVR to EVR (Permitted)	\$2,540	\$265,500	173,500	\$1.53
No VR to EVR (Non-Permitted)	\$5,860	\$5,478,400	1,414,400	\$3.87
Total	\$4750	\$5,743,900	1,587,900	\$3.61

COST ANALYSIS

Assumptions

- Statewide Annual Cost (\$/yr) =
$$\text{Cost (\$)} \times \# \text{ tanks} / \text{Component Lifetime (yrs)}$$
- Cost Effectiveness (\$/lb) =
$$\text{Annual Cost (\$/yr)} / \text{Emission Reductions (lbs/yr)}$$
- Component Lifetimes:
 - Standing Loss Control: 15 years
 - Phase I Components: 5 years
 - Phase II Components: 5 years

COST ANALYSIS

Assumptions

- Permitted Tank Population: 3200
 - Single Wall 992 tanks
 - Protected 2208 tanks
- Non-Permitted Tank Population: 6400
 - All Single Wall
- Emission Reductions (Statewide):
 - Pre-EVR to EVR for Permitted Tanks
 - No Standing Loss Control for Protected Tanks
 - No VR to EVR for Non-Permitted Tanks

Timeline

- March 1, 2007 Staff Report and Regulatory Proposal
- April 26-27, 2007 Board Hearing
- Effective Date July 1, 2008

QUESTIONS ?

Contacts

Regulatory

- Michael Werst (916) 449-5289 or mwerst@arb.ca.gov
- Joe Guerrero (916) 324-9487 or jguerrero@arb.ca.gov

- Field Study

- Pamela Gupta (916) 324-4458 or pgupta@arb.ca.gov
- Jim Watson (916) 327-1282 or jwatson@arb.ca.gov